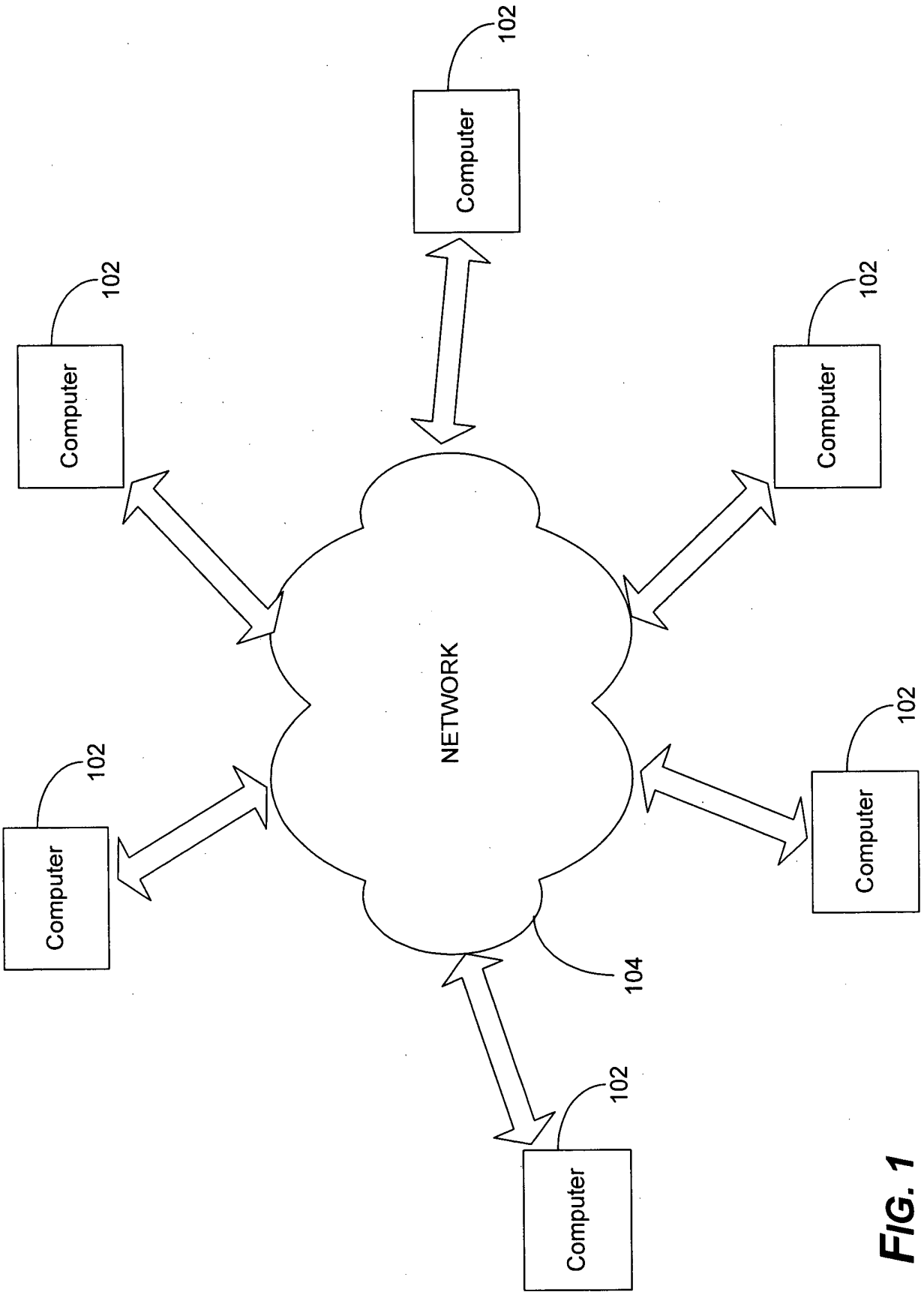
102
Computer
102
Computer
102
Computer
NETWORK
102
Computer
102
Computer
102
Computer
104

FIG. 1

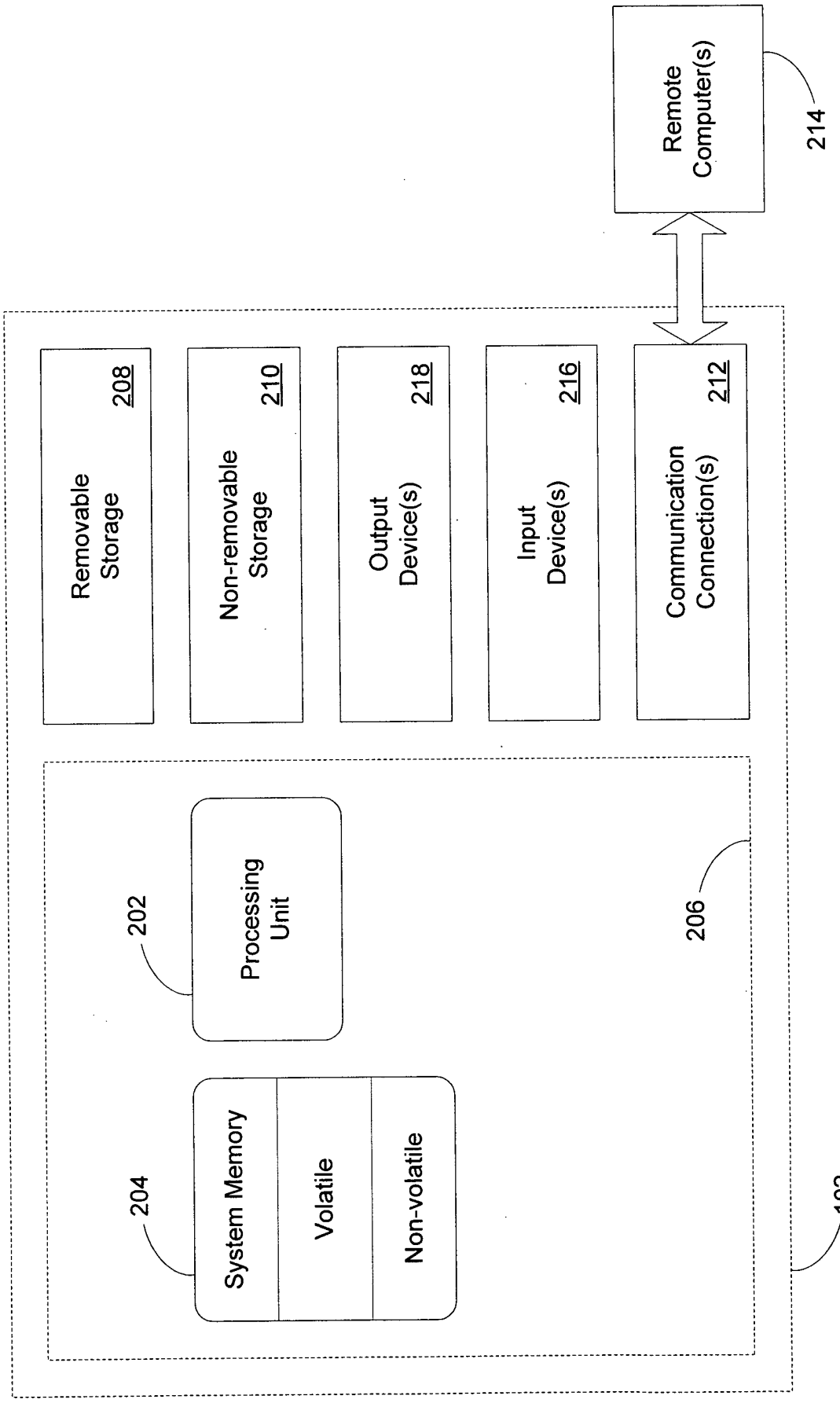
Remote Computer(s)
214
Removable Storage
208
Non-removable Storage
210
Output Device(s)
218
Input Device(s)
216
Communication Connection(s)
212
206
202
Processing Unit
204
System Memory
Volatile
Non-volatile
102

FIG. 2

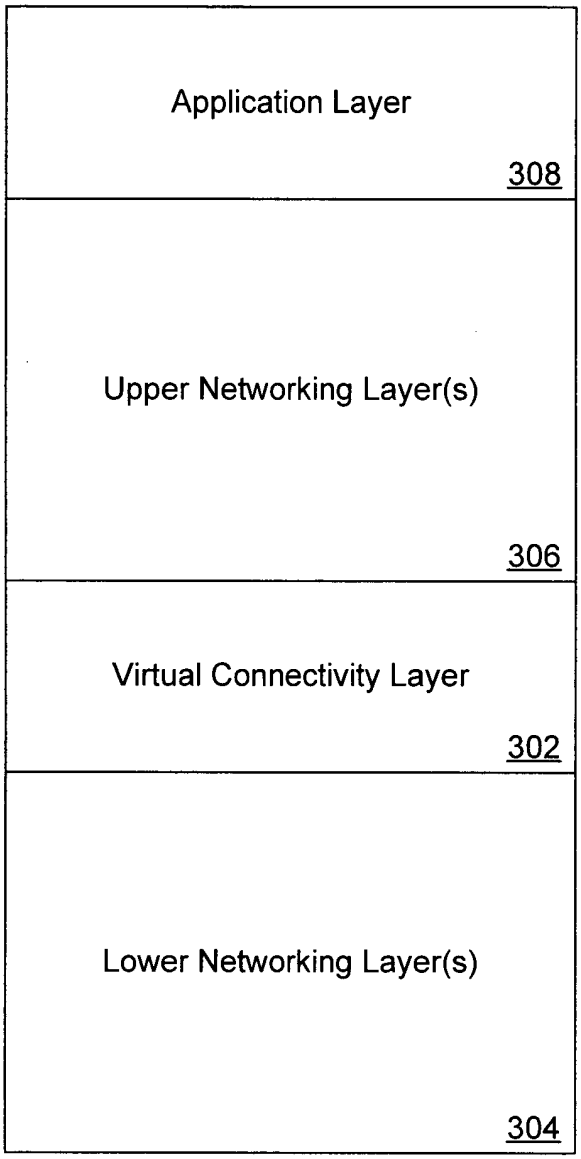
Application Layer
308
Upper Networking Layer(s)
306
Virtual Connectivity Layer
302
Lower Networking Layer(s)
304

FIG. 3

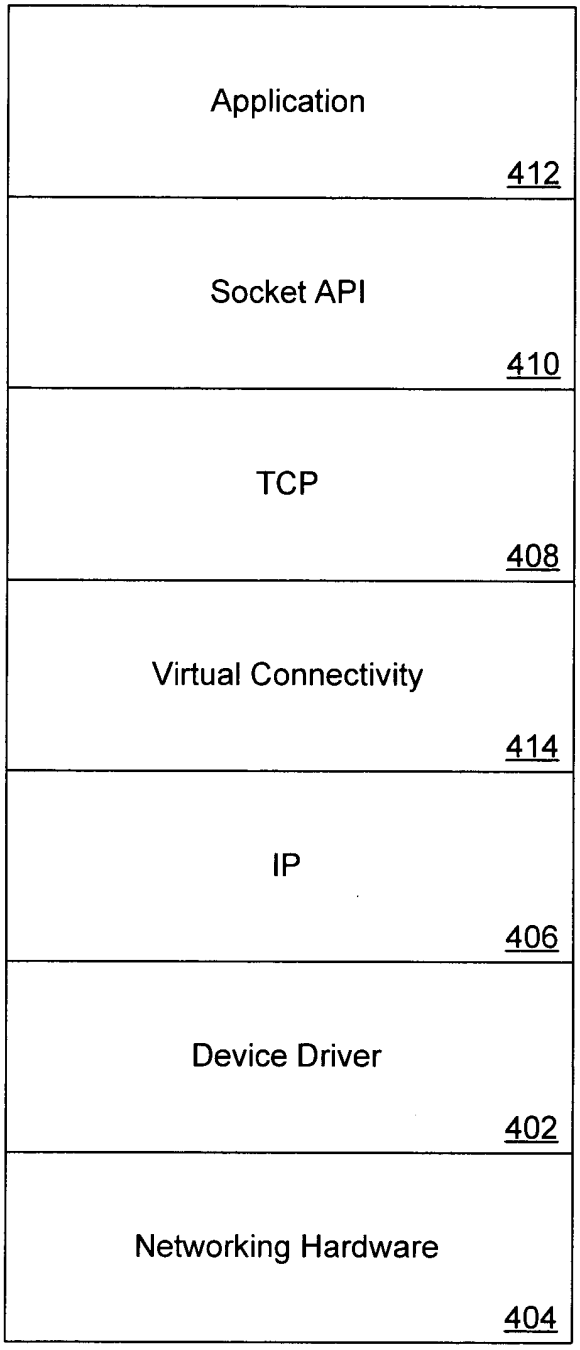
Application
412
Socket API
410
TCP
408
Virtual Connectivity
414
IP
406
Device Driver
402
Networking Hardware
404

FIG. 4

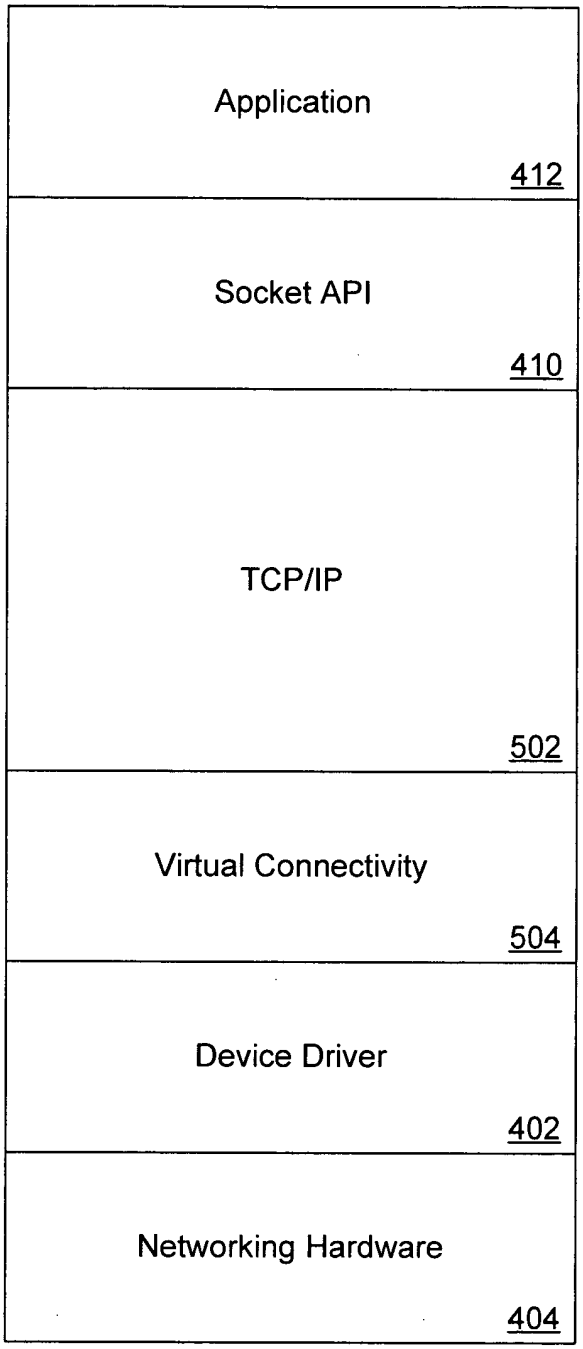
Application
412
Socket API
410
TCP/IP
502
Virtual Connectivity
504
Device Driver
402
Networking Hardware
404

FIG. 5

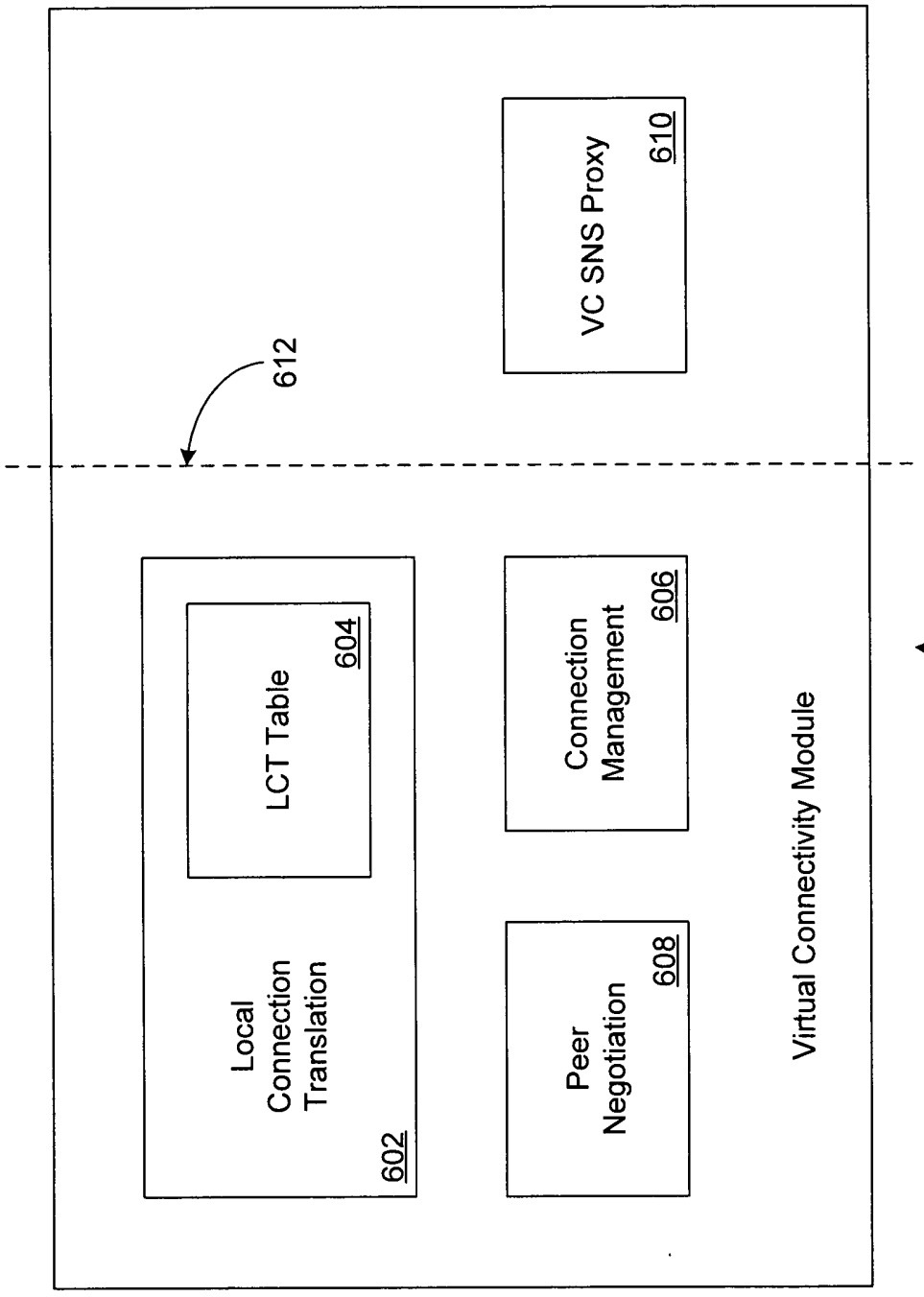
VC SNS Proxy
610
612
Local
Connection
Translation
602
LCT Table
604
Connection
Management
606
Peer
Negotiation
608
Virtual Connectivity Module
600

FIG. 6

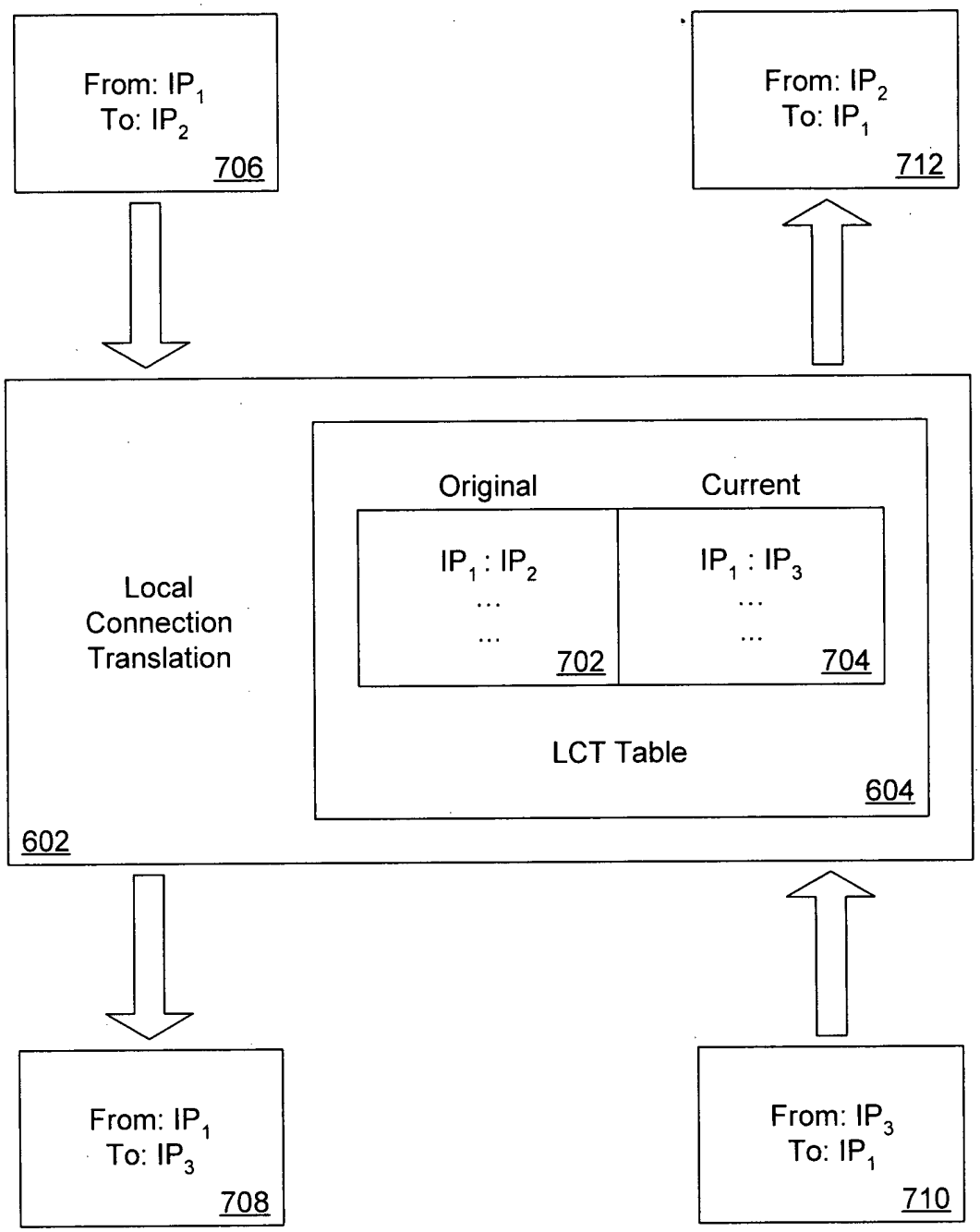
From: IP1
To: IP2
706
From: IP2
To: IP1
712
Local
Connection
Translation
Original
Current
IP1 : IP2
IP1 : IP3
702
704
LCT Table
604
602
From: IP1
To: IP3
708
From: IP3
To: IP1
710

FIG. 7

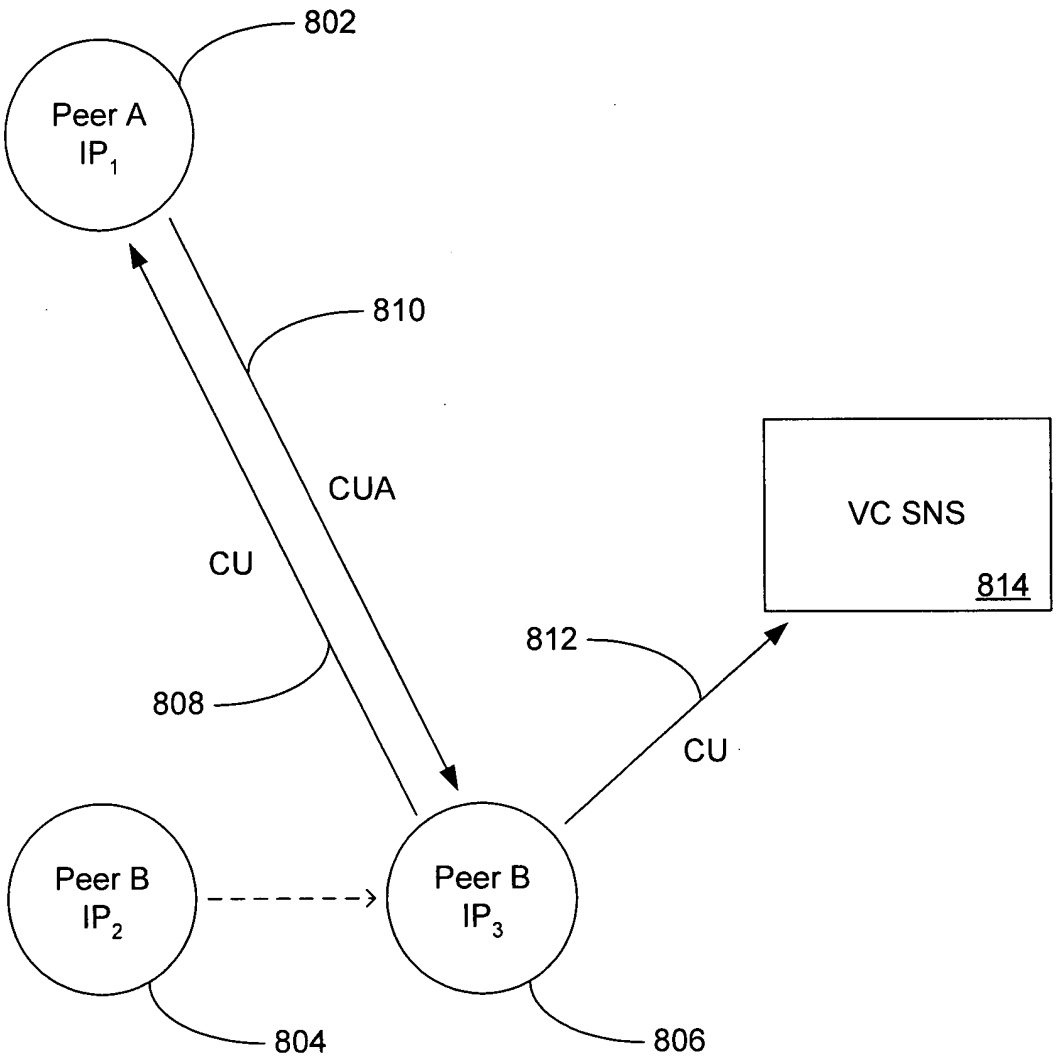
802
Peer A
IP1
810
CUA
CU
808
VC SNS
814
812
CU
Peer B
IP2
Peer B
IP3
804
806

FIG. 8

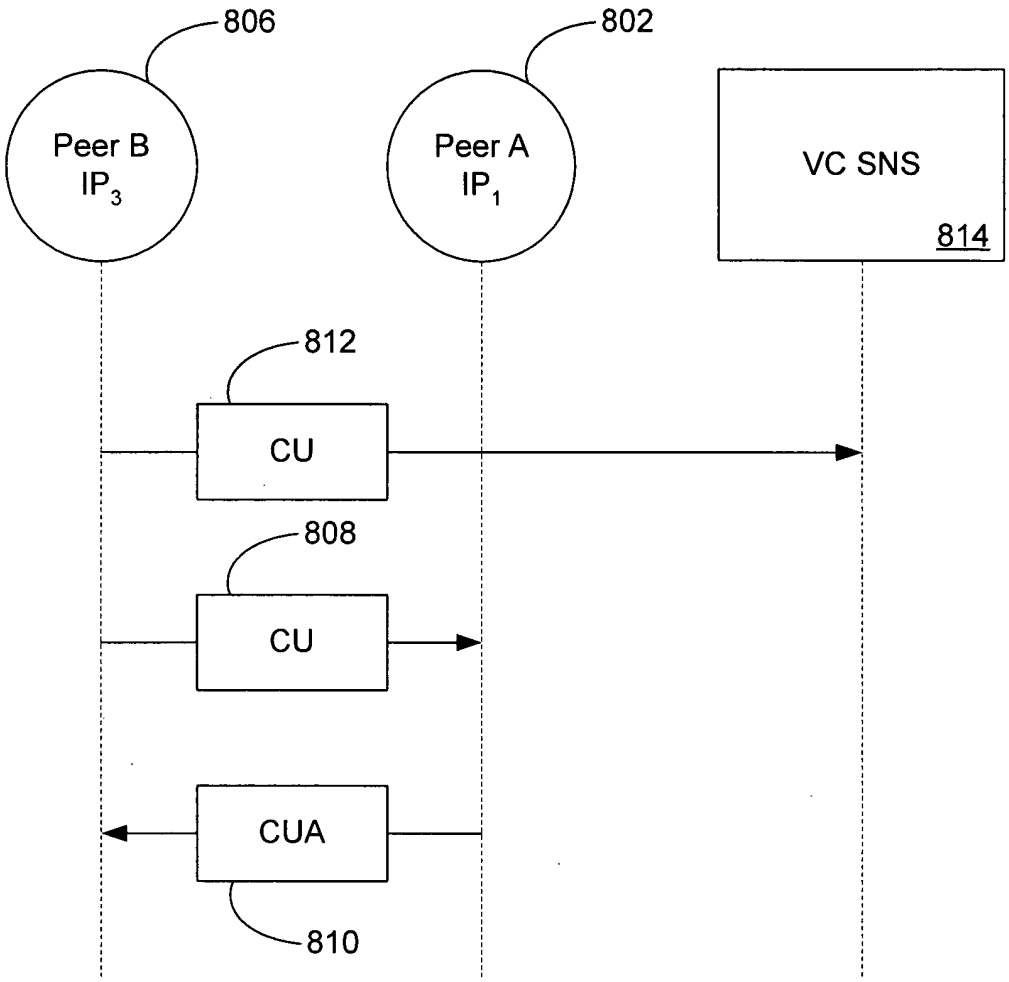

FIG. 9

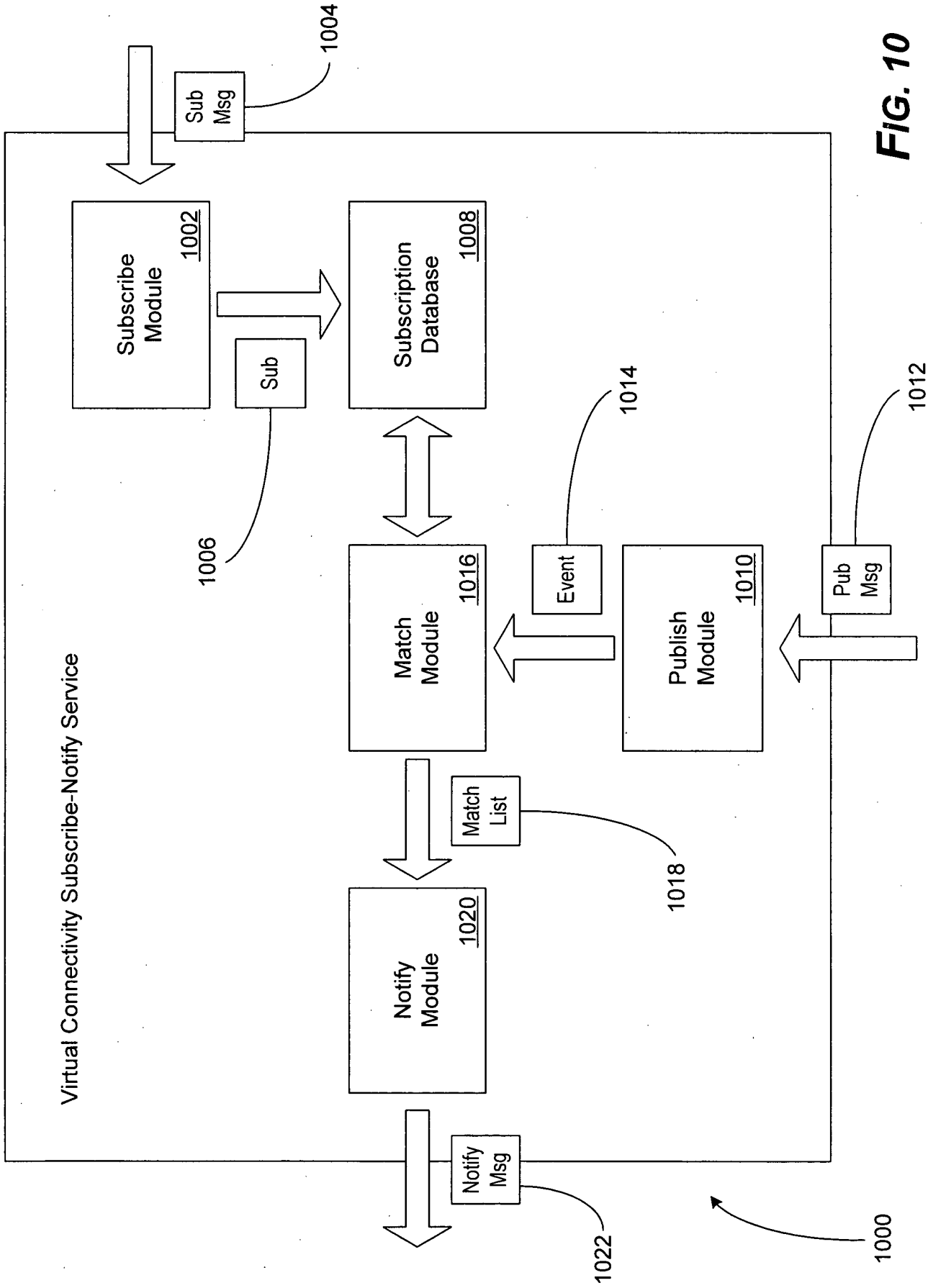
Virtual Connectivity Subscribe-Notify Service
Sub Msg
1004
Subscribe Module
1002
Sub
1006
Subscription Database
1008
Match Module
1016
Event
1014
Publish Module
1010
Pub Msg
1012
Match List
1018
Notify Module
1020
Notify Msg
1022
1000

FIG. 10

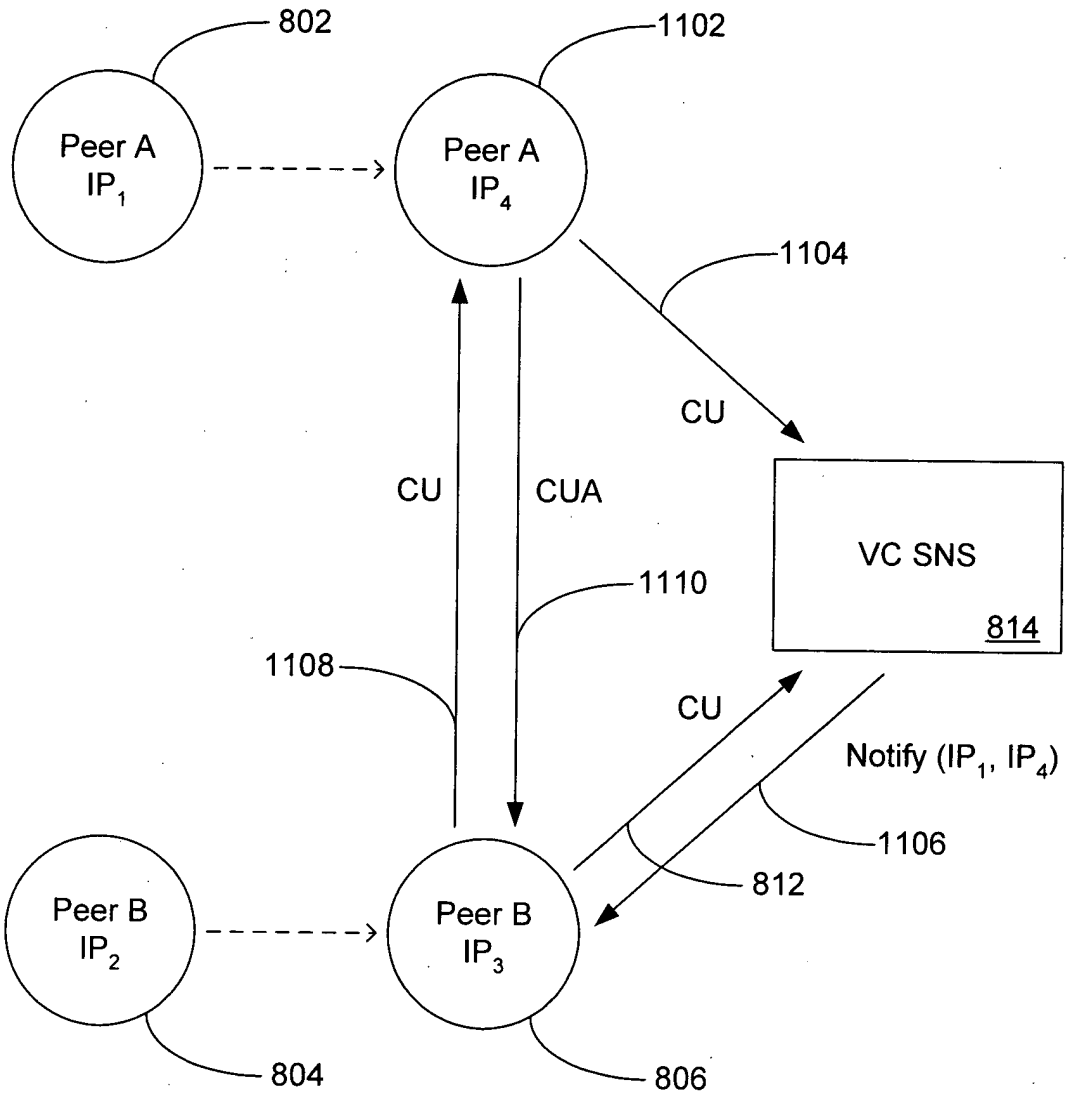
802
1102
Peer A
IP1
Peer A
IP4
1104
CU
CU
CUA
VC SNS
814
1110
1108
CU
Notify (IP1, IP4)
1106
812
Peer B
IP2
Peer B
IP3
804
806

FIG. 11

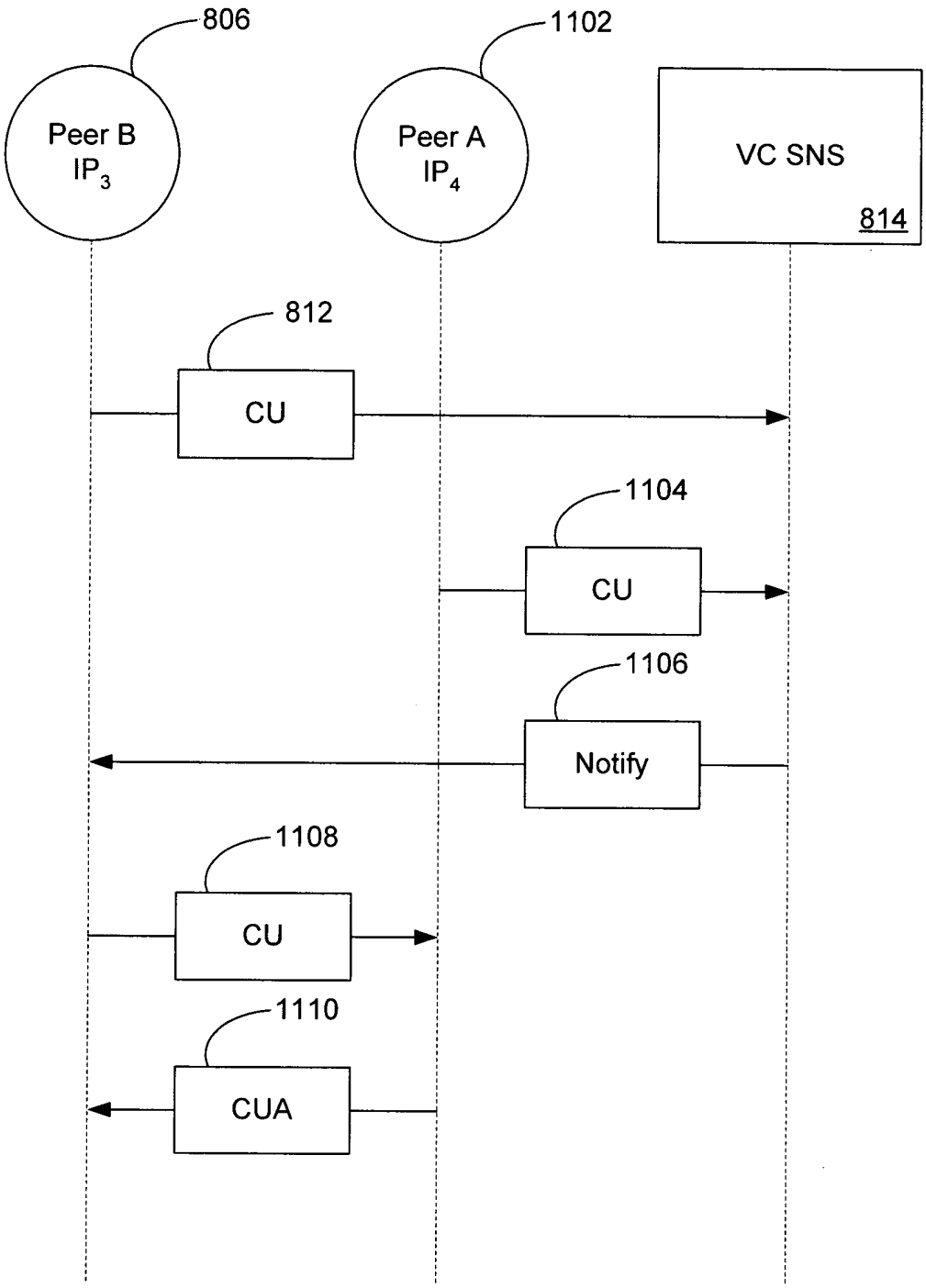
806
1102
Peer B
IP3
Peer A
IP4
VC SNS
814
812
CU
1104
CU
1106
Notify
1108
CU
1110
CUA

FIG. 12

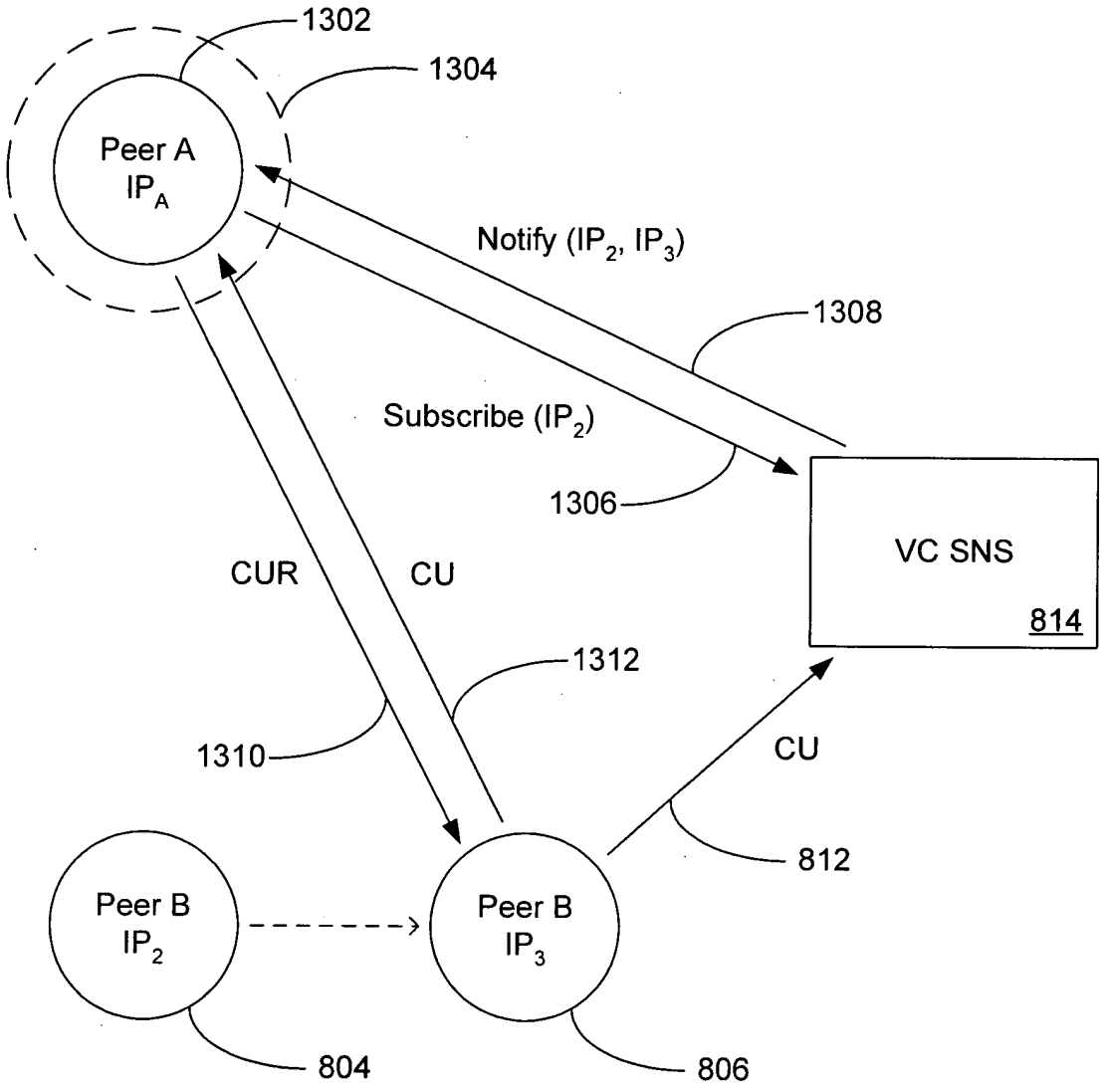
1302
1304
Peer A
IP_A
Notify (IP_2, IP_3)
1308
Subscribe (IP_2)
1306
VC SNS
814
CUR
CU
1312
1310
CU
812
Peer B
IP_2
Peer B
IP_3
804
806

FIG. 13

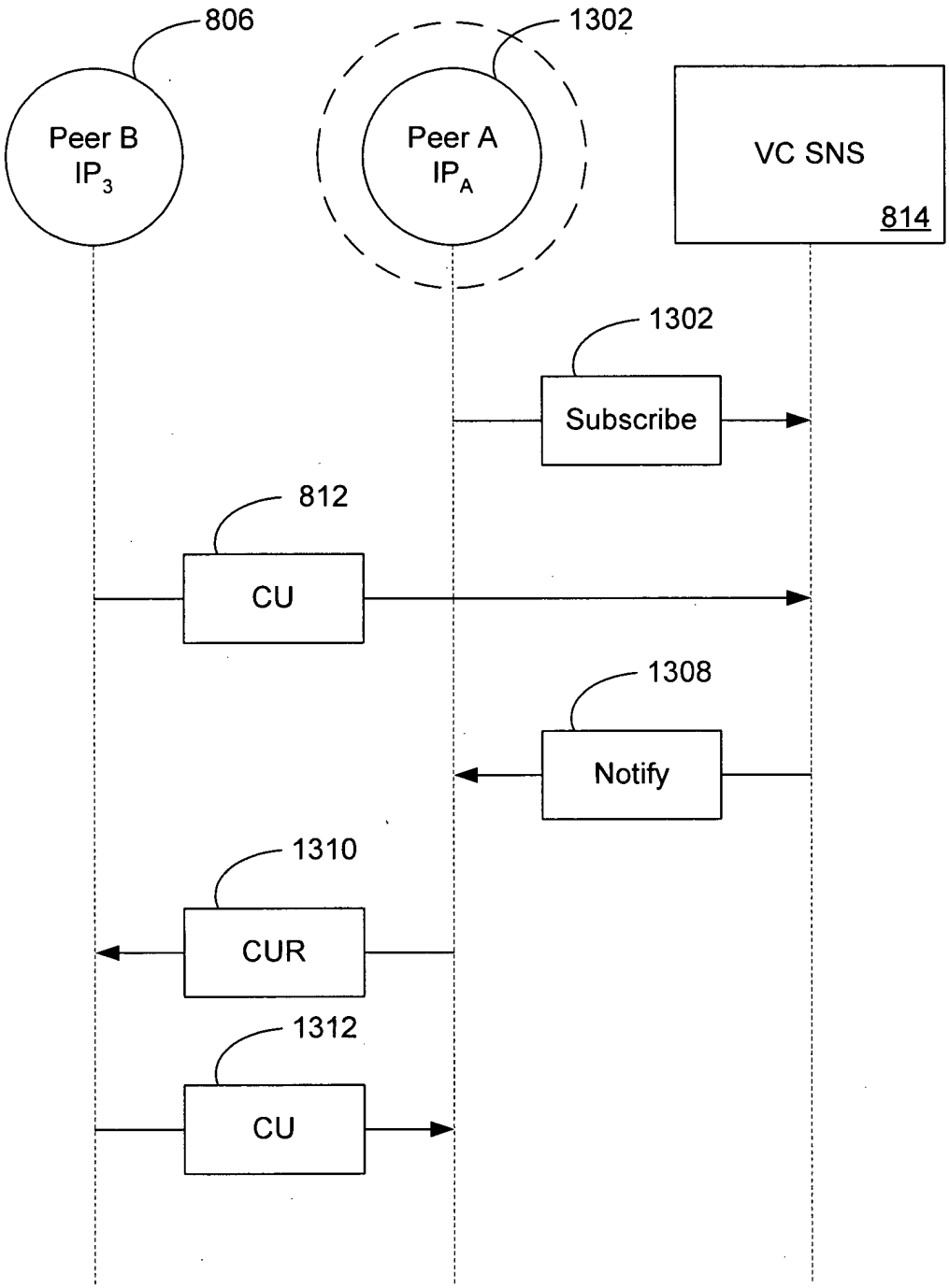
806
1302
Peer B
IP3
Peer A
IPA
VC SNS
814
1302
Subscribe
812
CU
1308
Notify
1310
CUR
1312
CU

FIG. 14

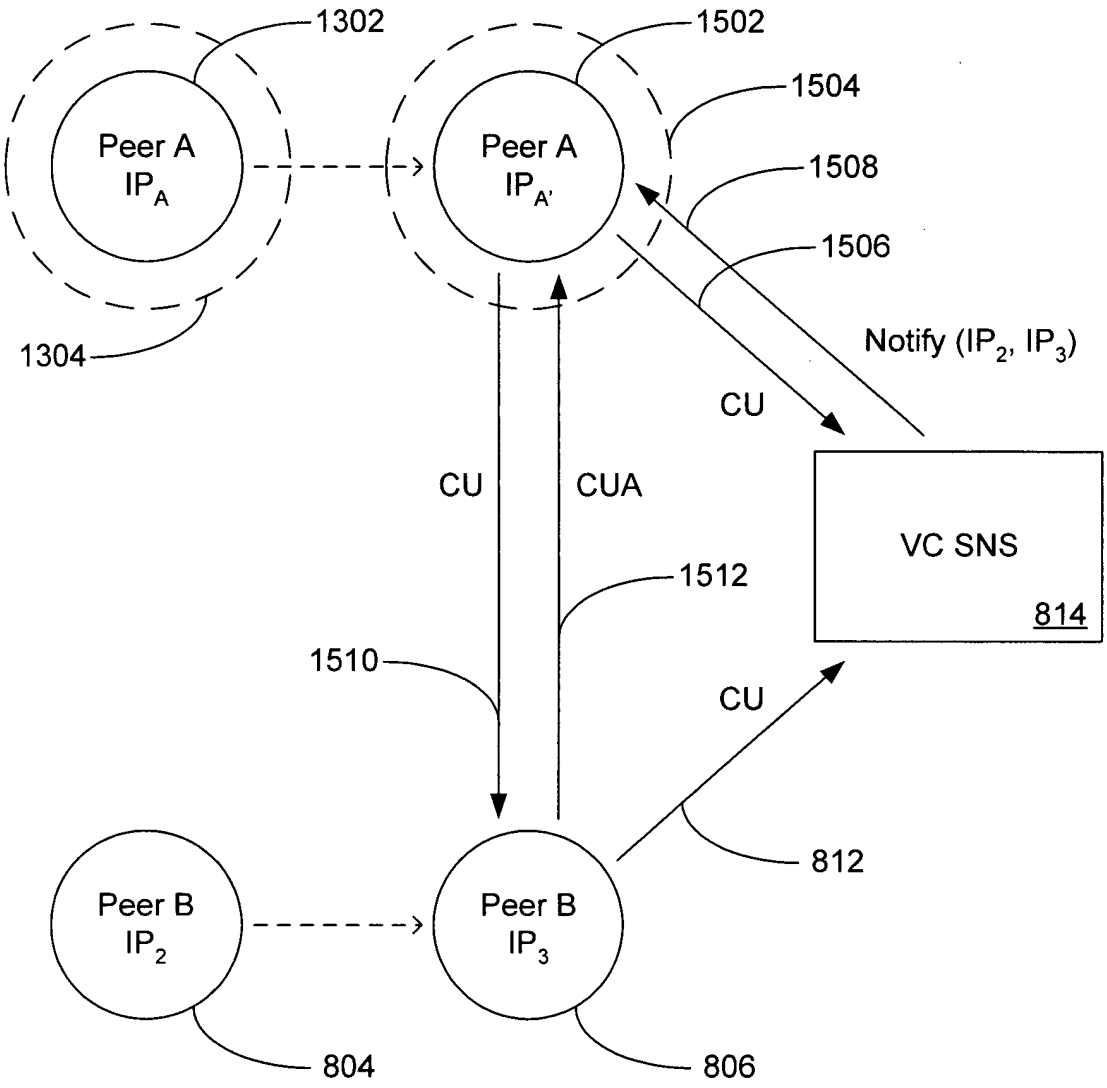
1302
1502
1504
1508
1506
Peer A
IP_A
Peer A
$IP_{A'}$
1304
Notify (IP_2, IP_3)
CU
CU
CUA
VC SNS
814
1512
1510
CU
812
Peer B
IP_2
Peer B
IP_3
804
806

FIG. 15

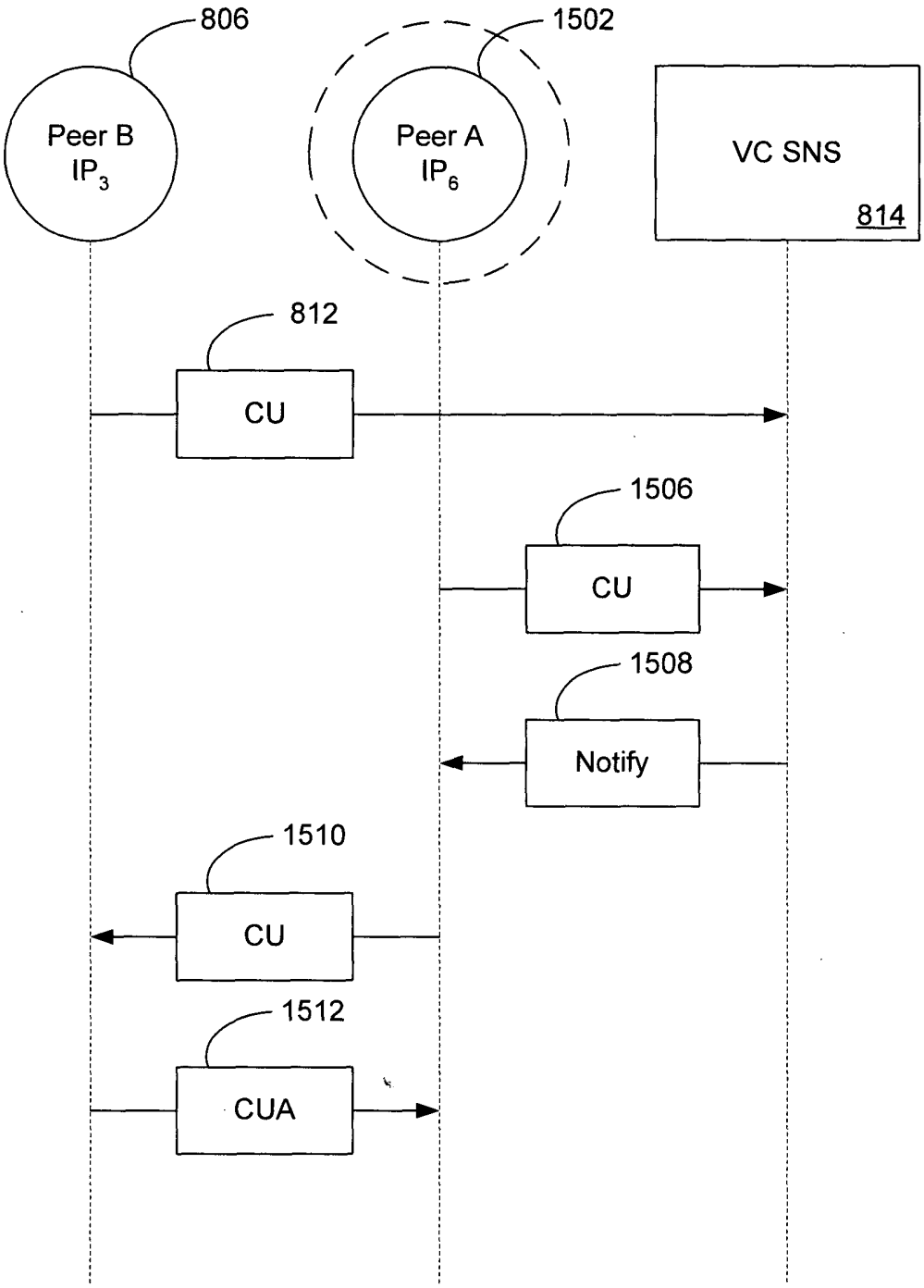
806
1502
Peer B
IP3
Peer A
IP6
VC SNS
814
812
CU
1506
CU
1508
Notify
1510
CU
1512
CUA

FIG. 16

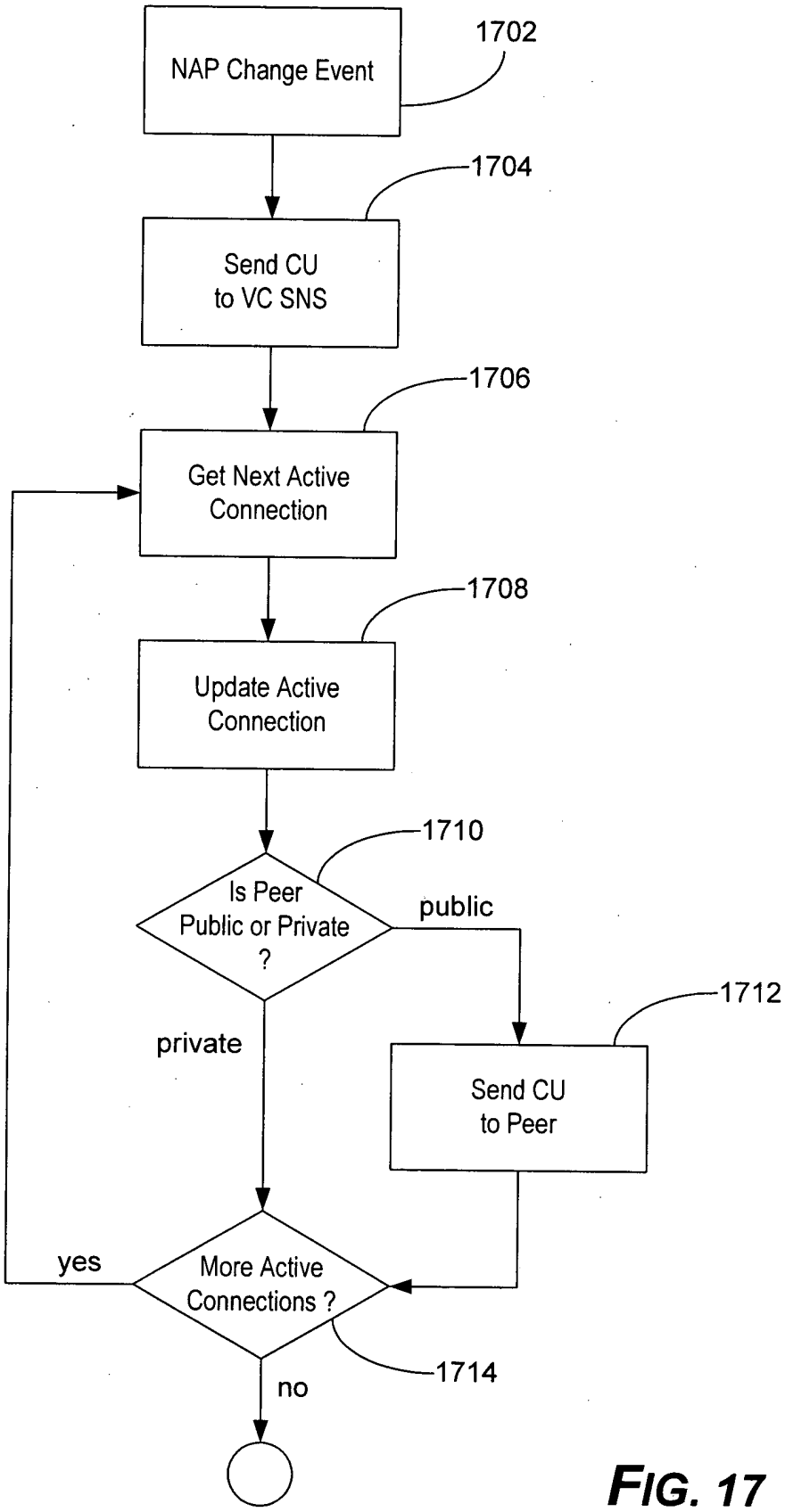
NAP Change Event
1702
1704
Send CU to VC SNS
1706
Get Next Active Connection
1708
Update Active Connection
1710
Is Peer Public or Private ?
public
1712
private
Send CU to Peer
yes
More Active Connections ?
1714
no

FIG. 17

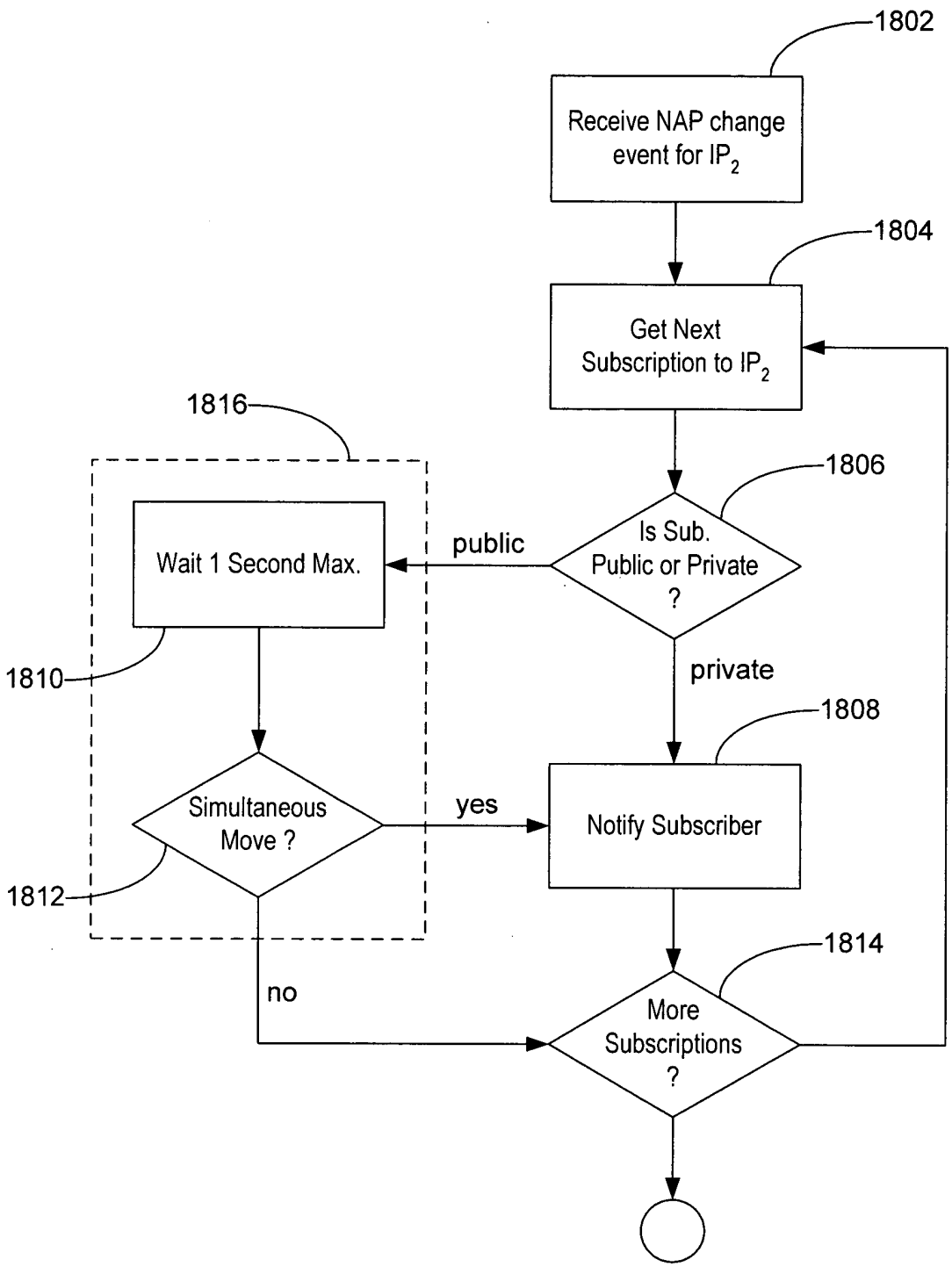
1802
Receive NAP change event for IP_2
1804
Get Next Subscription to IP_2
1816
1806
Is Sub. Public or Private ?
public
Wait 1 Second Max.
private
1810
1808
Simultaneous Move ?
yes
Notify Subscriber
1812
1814
no
More Subscriptions ?

FIG. 18

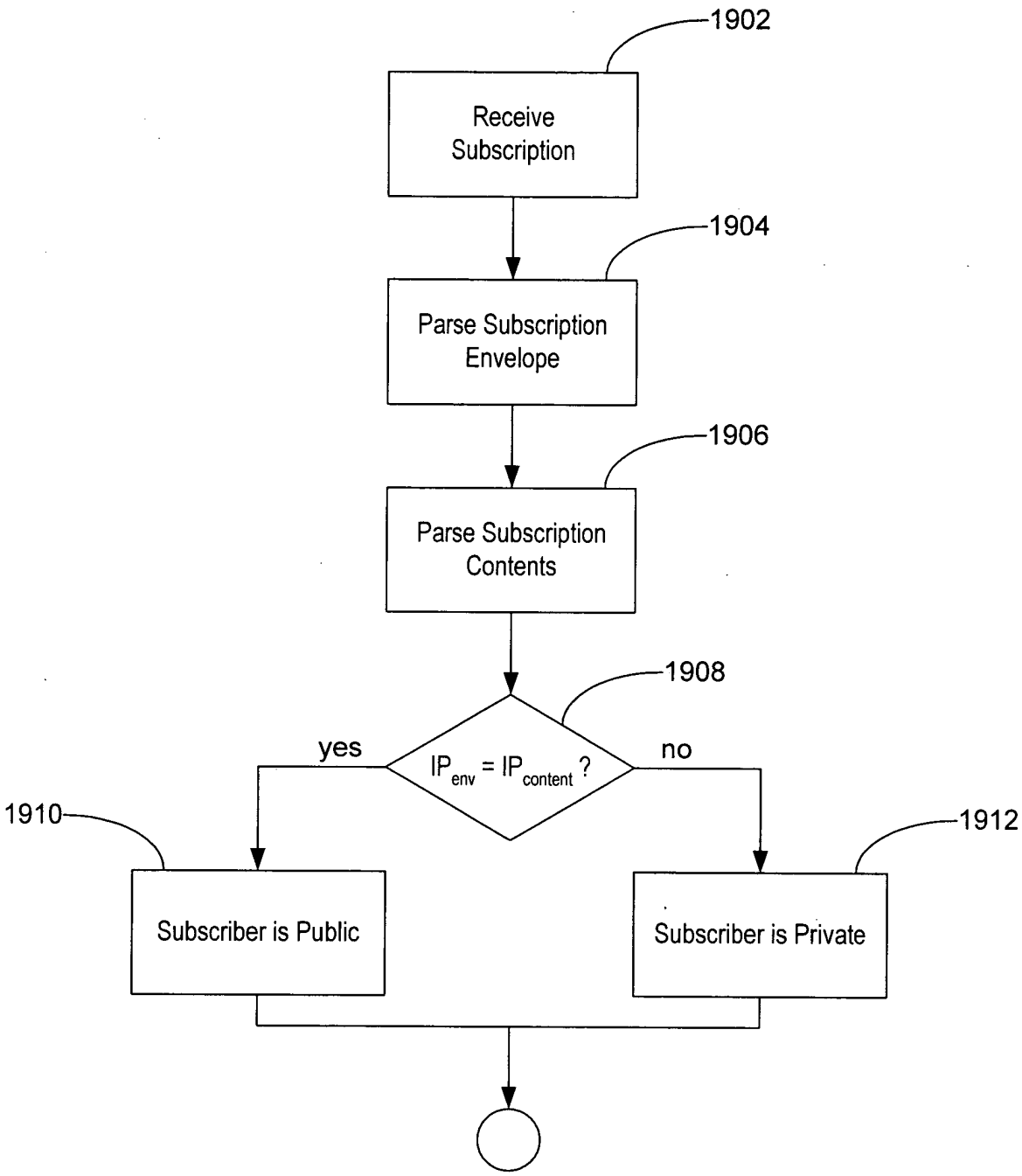
1902
Receive Subscription
1904
Parse Subscription Envelope
1906
Parse Subscription Contents
1908
yes
$IP_{env} = IP_{content}$?
no
1910
Subscriber is Public
1912
Subscriber is Private

FIG. 19

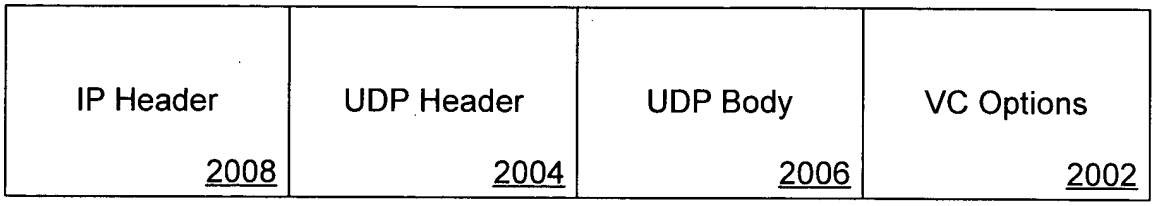

FIG. 20

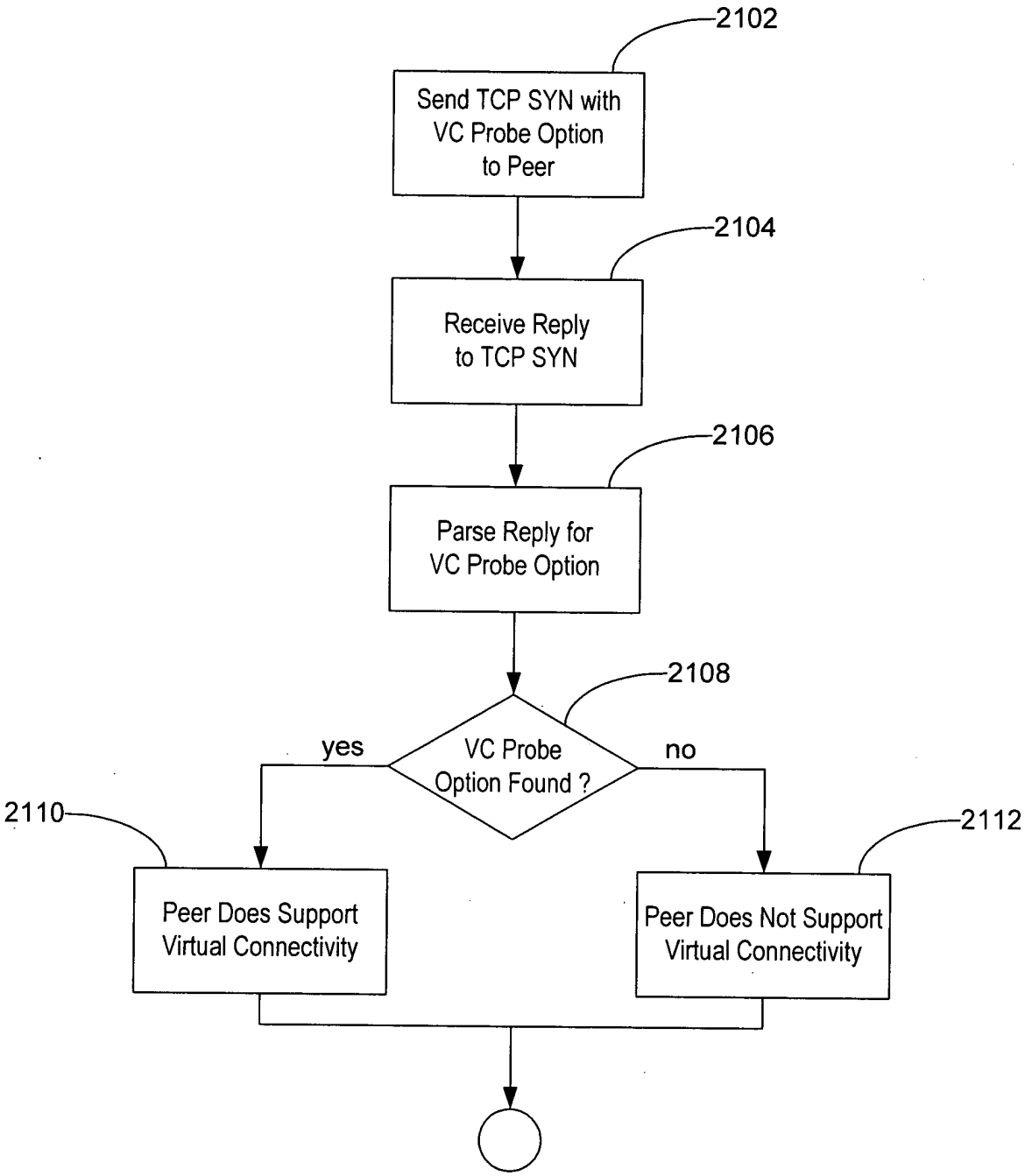
2102
Send TCP SYN with VC Probe Option to Peer
2104
Receive Reply to TCP SYN
2106
Parse Reply for VC Probe Option
2108
VC Probe Option Found ?
yes
no
2110
Peer Does Support Virtual Connectivity
2112
Peer Does Not Support Virtual Connectivity

FIG. 21